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### ***Clostridium difficile* in Illinois Acute Care Hospitals, NHSN Surveillance Reporting January 1, 2012 – June 30, 2012**

*Clostridium difficile*, also referred to as *C. difficile*, is a common cause of bacterial diarrhea in hospitalized patients. *C. difficile*-associated diarrhea ranges from mild to severe and can sometimes result in severe inflammation of the intestines and, in some instances, lead to death. The *C. difficile* organism can be found in feces, and is transferred from infected patients or contaminated environmental surfaces to patients via the hands of hospital personnel. Patients also can become infected if they touch objects or surfaces that are contaminated with *C. difficile* and then touch their mouth. Although a person may have the organism in their intestines, it does not usually cause disease until antibiotics alter normal intestinal flora, promoting overgrowth with *C. difficile*.

([http://www.cdc.gov/HAI/organisms/cdiff/Cdiff\\_infect.html](http://www.cdc.gov/HAI/organisms/cdiff/Cdiff_infect.html))

Gathering and analyzing surveillance data about specific infections helps us better understand the burden posed by a particular disease and helps in planning interventions to reduce infections. While it is difficult to reduce infections to zero, following specific protocols can greatly reduce the risk. Illinois hospitals are participating in programs to reduce the number of infections acquired during hospital stays.

As of January 1, 2012, all Illinois hospitals began mandated reporting of *C. difficile* infections (CDI) using the Center for Disease Control and Prevention's National Healthcare Safety Network (NHSN) Multidrug-Resistant Organism (MDRO) Laboratory-identified (LabID) Event module. ([http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO\\_CDADcurrent.pdf](http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO_CDADcurrent.pdf))

NHSN reporting enables a facility to rely almost exclusively on data obtained from the laboratory and allows the calculation of proxy measures of CDI events, exposures and healthcare acquisition. **This is the first Illinois Department of Public Health report on CDI rates using data submitted by hospitals to NHSN.**

## Methods

Cases of CDI are defined in NHSN as a laboratory result on a stool sample that is positive for *C. difficile*. Cases are then categorized in relation to when the patient was admitted to the facility.

- **Hospital-onset (HO)** cases are those in which the positive stool sample for *C. difficile* was collected on day four of the hospital stay or later.
- **Community-onset (CO)** cases are those for which the positive stool sample was collected within the first three days of the hospital admission.
- **Community-onset hospital-associated (CO-HA)** cases are those for which the positive stool sample was collected within the first three days of the hospital admission and the patient had been discharged from the same facility within the previous four weeks.
- **Hospital Associated (HA)** cases are the sum of HO LabID Events and community onset hospital associated (CO-HA) LabID Events.

Duplicate laboratory tests, or those repeated on the same patient within two weeks of a positive laboratory result, are excluded from the count of laboratory identified events (LabID event). The unit of analysis for this data is the number of patient days for the facility. Neonatal intensive care units and well-baby nurseries are excluded from NHSN reporting of CDI LabID events.

## Interpretation

A number of factors that can contribute to CDI rates that are beyond the control of the hospital have not been adjusted for in this report. For example, adults aged 65 years or older have a higher risk for acquiring CDI. Patients from communities with a high community onset rate may also be more likely to be colonized with *C. difficile* and therefore at higher risk for infection. Additionally, patients with more complex medical needs may have longer lengths of stay, which also puts them at an increased risk of acquiring CDI. Adjusting hospital-onset CDI rates to account for differences in patient populations requires additional data that was not available at the time this report was prepared. **Therefore, the data in this report should be used as a hospital baseline and not for comparing hospitals with each other.**

There are a variety of tests used to detect *C. difficile* and the type of laboratory test used can dramatically influence the CDI rate. This report categorizes CDI rates according to whether the hospital uses Molecular or Non-molecular testing for detection of CDI. A molecular test, or nucleic acid amplification test (NAAT), such as PCR is the preferred testing method because it is more sensitive and detects more cases. Facilities that use the recommended NAAT/PCR test would therefore have more cases identified (appear to have higher rates) than if they used a less sensitive, non-molecular test such as Enzyme immunoassay (EIA). Some facilities reported using more than one type of test. For this report, facilities were categorized as “molecular” if they reported using any type of molecular testing.

## Results

At this time, individual facility rates for hospital-associated (HA) and community-onset (CO) CDI rates are not provided, but will be included in future reports. Pooled rates for HO and HA CDI rates are presented in table 1.

The hospital onset (HO) *C. difficile* rate is calculated for each hospital, as well as corresponding 95% confidence intervals for each “Testing Method” group. If a 95% confidence interval around a hospital’s rate excludes the comparison value, then a statistical test for the difference between the two values would be significant at the 0.05 level.

For example, if a hospital’s HO rate is 11.71, with a 95% confidence interval between 9.25 and 14.38 and the pooled rate is 8.4, then the difference between the two values, 11.71 and 8.4, would be significant at the 0.05 level. In other words, the hospital’s HO is significantly greater than the pooled rate. If, however, the pooled value was 10.3, which lies within the confidence interval of 9.25 and 14.38, the difference between the hospital-specific rate and the pooled rate would not be significantly different.

Inter-hospital comparisons within or between “Testing Method” groups are not advised as adjustment for differences in patient populations that affect infection risk, such as age and residence in a skilled nursing facility, have not been implemented. NHSN is currently developing a statistical model to adjust for these and other differences that will allow for comparative analyses.

## Conclusion

This is the first report of CDI rates among Illinois facilities using NHSN data. The new reporting method through NHSN ensures standard definitions of CDI cases, utilizing laboratory data. However, the data presented in this report have not been risk adjusted, and therefore comparisons between hospitals should be avoided. These data present the first six months of reporting of CDI to NHSN, and establishes a baseline of CDI incidence at the facility level. This information will be helpful in planning infection prevention initiatives and tracking progress at preventing infections over time. Risk adjustment of CDI rates based on facility-specific factors is forthcoming and will allow for more accurate comparison between facilities and with CDI rates nationally reported through NHSN.

**Table 1**

**Pooled Incidence Rates of *C. difficile* events in Illinois Acute Care Hospitals per 10,000 patient days**

**Reporting Period: January 1, 2012 – June 30, 2012**

<b>Pooled<sup>b</sup> CDI Incidence Rate<sup>c</sup></b>	<b>Testing Method<sup>a</sup></b>			
	<b>Molecular</b> Total inpatient days 2,101,300		<b>Non-Molecular</b> Total inpatient days 1,154,838	
	<b># of LabID Events</b>	<b>Rate per 10,000 patient days</b>	<b># of LabID Events</b>	<b>Rate per 10,000 patient days</b>
<b>Hospital Onset<sup>e</sup></b>	1768	8.41	603	5.22
<b>Hospital-Associated<sup>f</sup></b>	2619	12.46	920	7.97

**Table 2**  
**Incidence Rates of Hospital Onset *C. difficile* events**  
**Reporting Period: January 1, 2012 – June 30, 2012**  
**Testing Method: Molecular<sup>a</sup>**

					95% Confidence Interval <sup>g</sup>	
HOSPITAL	CITY	Events Hospital Onset	Patient Days	Hospital Onset Rate <sup>e</sup>	Lower Bound	Upper Bound
<b>Pooled Data<sup>b</sup></b>		<b>1768</b>	<b>2101300</b>	<b>8.41</b>		
Adventist Bolingbrook Hospital	Bolingbrook	11	9228	11.92	6	21.3
Adventist GlenOaks Hospital	Glendale Hts	11	15502	7.1	3.5	12.7
Adventist Hinsdale Hospital	Hinsdale	16	25872	6.18	3.5	10
Adventist LaGrange Memorial Hospital	La Grange	24	19414	12.36	7.9	18.4
Advocate BroMenn Medical Center	Normal	21	19065	11.02	6.8	16.8
Advocate Christ Medical Center	Oak Lawn	127	92678	13.7	11.4	16.3
Advocate Condell Medical Center	Libertyville	23	35540	6.47	4.1	9.7
Advocate Eureka Hospital	Eureka	0	1008	0	0	36.6
Advocate Good Samaritan	Downers Grove	18	36443	4.94	2.9	7.8
Advocate Good Shepherd Hospital	Barrington	23	21488	10.7	6.8	16.1
Advocate Illinois Masonic Medical Center	Chicago	16	36178	4.42	2.5	7.2
Advocate Lutheran General Hospital	Park Ridge	53	75690	7	5.2	9.2
Advocate South Suburban Hospital	Hazel Crest	25	26399	9.47	6.1	14
Advocate Trinity Hospital	Chicago	11	21876	5.03	2.5	9
Ann and Robert H Lurie Children's Hospital of Chicago	Chicago	11	26649	4.13	2.1	7.4
Blessing Hospital	Quincy	28	31715	8.83	5.9	12.8
Carle Foundation Hospital	Urbana	46	42484	10.83	7.9	14.4

CGH Medical Center	Sterling	2	8805	2.27	0.3	8.2
Decatur Memorial Hospital	Decatur	28	20669	13.55	9	19.6
Delnor-Community Hospital	Geneva	10	14016	7.14	3.4	13.1
Edward Hospital	Naperville	36	41722	8.63	6	11.9
Elmhurst Memorial Hospital	Elmhurst	22	23942	9.19	5.8	13.9
Fairfield Memorial Hospital	Fairfield	1	2094	4.78	0.1	26.6
GMC - Illini Campus	Silvis	5	6975	7.17	2.3	16.7
Good Samaritan Regional Health Center	Mount Vernon	11	13180	8.35	4.2	14.9
Hamilton Memorial Hospital District	Mcleansboro	0	1446	0	0	25.5
Ingalls Memorial Hospital	Harvey	21	42380	4.96	3.1	7.6
Kishwaukee Community Hospital	De Kalb	2	10244	1.95	0.2	7.1
KSB Hospital	Dixon	6	7415	8.09	3	17.6
Little Company of Mary Hospital	Evergreen Park	40	29164	13.72	9.8	18.7
Loyola University Medical Center	Maywood	47	57241	8.21	6	10.9
Marshall Browning Hospital	Duquoin	0	826	0	0	44.7
McDonough District Hospital	Macomb	1	3785	2.64	0.1	14.7
Memorial Medical Center	Springfield	54	65303	8.27	6.2	10.8
Mercy Harvard Hospital	Harvard	0	353	0	0	104.5
Mercy Hospital and Medical Center	Chicago	12	32019	3.75	1.9	6.5
Methodist Medical Center of Illinois	Peoria	15	37769	3.97	2.2	6.6
Midwestern Regional Medical Center	Zion	9	7393	12.17	5.6	23.1
Morris Hospital	Morris	9	8248	10.91	5	20.7
NorthShore University HealthSystem Skokie Hospital	Skokie	10	17783	5.62	2.7	10.3
NorthShore University HealthSystem: Evanston Hospital	Evanston	38	40336	9.42	6.7	12.9
NorthShore University HealthSystem: Glenbrook Hospital	Glenview	40	22640	17.67	12.6	24.1
NorthShore University HealthSystem: Highland Park Hospital	Highland Park	18	20152	8.93	5.3	14.1
Northwest Community Hospital	Arlington Heights	41	45011	9.11	6.5	12.4
OSF Saint Anthony Medical Center	Rockford	38	23718	16.02	11.3	22

OSF Saint Elizabeth Medical Center	Ottawa	4	6788	5.89	1.6	15.1
OSF Saint Francis Medical Center	Peoria	116	82594	14.05	11.6	16.8
OSF St. James John W. Albrecht Medical Center	Pontiac	4	2197	18.21	5	46.6
OSF St. Mary Medical Center	Galesburg	5	7821	6.39	2.1	14.9
Our Lady of Resurrection Hospital	Chicago	8	24419	3.28	1.4	6.5
Perry Memorial Hospital	Princeton	0	2054	0	0	18
Pinckneyville Community Hospital	Pinckneyville	1	786	12.72	0.3	70.9
Provena Covenant Medical Center	Urbana	10	15831	6.32	3	11.6
Provena Mercy Medical Center	Aurora	14	24566	5.7	3.1	9.6
Provena Saint Joseph Hospital	Elgin	10	22178	4.51	2.2	8.3
Provena St. Joseph Medical Center	Joliet	47	57132	8.23	6	10.9
Provena St. Mary's Hospital	Kankakee	11	13879	7.93	4	14.2
Provena United Samaritans Medical Center	Danville	6	12156	4.94	1.8	10.7
Resurrection Medical Center	Chicago	33	36883	8.95	6.2	12.6
Riverside Medical Center	Kankakee	23	29837	7.71	4.9	11.6
Rockford Memorial Hospital	Rockford	26	25614	10.15	6.6	14.9
Rush Copley Medical Center	Aurora	20	23048	8.68		13.4
Rush Oak Park Hospital	Oak Park	16	13299	12.03	6.9	19.5
Saint Anthony Hospital	Chicago	6	15556	3.86	1.4	8.4
Saint Francis Hospital	Evanston	19	19041	9.98	6	15.6
Salem Township Hospital	Salem	2	1555	12.86	1.6	46.5
Sarah D Culbertson Memorial Hospital	Rushville	0	954	0	0	38.7
Shriners Hospitals for Children	Chicago	1	1046	9.56	0.2	53.3
SOUTH SHORE HOSPITAL	Chicago	12	12735	9.42	4.9	16.5
St Joseph Memorial Hospital	Murphysboro	1	1759	5.69	0.1	31.7
St Mary and Elizabeth Medical Center - Division Campus	Chicago	27	60698	4.45	2.9	6.5
St. James Hospital and Health Centers	Chicago Heights	44	45209	9.73	7.1	13.1
St. James Hospital and Health Centers	Olympia Fields	44	45209	9.73	7.1	13.1
St. John's Hospital	Springfield	29	45114	6.43	4.3	9.2

St. Joseph Medical Center	Bloomington	8	13422	5.96	2.6	11.7
St. Mary's Hospital	Centralia	6	12815	4.68	1.7	10.2
St. Mary's Hospital	Decatur	17	22133	7.68	4.5	12.3
Swedish American Hospital	Rockford	19	33181	5.73	3.4	8.9
Thomas H Boyd Memorial Hospital	Carrollton	1	1036	9.65	0.2	53.8
Thorek Memorial Hospital	Chicago	10	13363	7.48	3.6	13.8
Touchette Regional Hospital	Centreville	2	5320	3.76	0.5	13.6
Trinity Medical Center – IL	Rock Island	25	38371	6.52	4.2	9.6
University of Chicago Medical Center	Chicago	86	66910	12.85	10.3	15.9
University of Illinois Medical Center at Chicago	Chicago	53	59096	8.97	6.7	11.7
Valley West Community Hospital	Sandwich	0	1652	0	0	22.3
Vista Medical Center East	Waukegan	16	21035	7.61	4.3	12.4
Vista Medical Center West	Waukegan	1	7410	1.35	0	7.5
VHS West Suburban Medical Center	Oak Park	5	13740	3.64	1.2	8.5



**Table 3**  
**Incidence Rates of Hospital Onset *C. difficile* events**  
**Reporting Period: January 1, 2012 – June 30, 2012**  
**Testing Method: Non-Molecular<sup>a</sup>**

					95% Confidence Interval <sup>b</sup>	
HOSPITAL	CITY	Events Hospital Onset	Patient Days	Hospital Onset Rate <sup>e</sup>	Lower Bound	Upper Bound
<b>Pooled Data<sup>b</sup></b>		<b>603</b>	<b>1154838</b>	<b>5.21</b>		
Abraham Lincoln Memorial Hospital	Lincoln	0	2308	0	0	16
Alexian Brothers Medical Center	Elk Grove Village	20	51397	3.89	2.4	6
Alton Memorial Hospital	Alton	9	11711	7.69	3.5	14.6
Anderson Hospital	Maryville	10	14336	6.98	3.3	12.8
Carlinville Area Hospital	Carlinville	1	1864	5.37	0.1	29.9
Centegra Hospital - McHenry	Mchenry	8	22050	3.63	1.6	7.1
Centegra Hospital - Woodstock	Woodstock	2	14170	1.41	0.2	5.1
Central DuPage Hospital	Winfield	6	43849	1.37	0.5	3
Community Memorial Hospital	Staunton	0	503	0	0	73.3
Crawford Memorial Hospital	Robinson	2	1933	10.35	1.3	37.4
Crossroads Community Hospital	Mount Vernon	2	2575	7.77	0.9	28.1
Dr. John Warner Hospital	Clinton	0	693	0	0	53.2
Fayette County Hospital	Vandalia	1	1428	7	0.2	39
Ferrell Hospital Community Foundation	Eldorado	0	1679	0	0	22
FHN Memorial Hospital	Freeport	2	8005	2.5	0.3	9
Franklin Hospital	Benton	0	553	0	0	66.7

Galesburg Cottage Hospital	Galesburg	4	9841	4.07	1.1	10.4
Gateway Regional Medical Center	Granite City	4	20035	2	0.5	5.1
Gibson Area Hospital & Health Services	Gibson City	0	1241	0	0	29.7
Gottlieb Memorial Hospital	Melrose Park	11	22956	4.79	2.4	8.6
Graham Hospital	Canton	2	8574	2.33	0.3	8.4
Greenville Regional Hospital	Greenville	4	2818	14.19	3.9	36.3
Hammond-Henry Hospital	Geneseo	0	1479	0	0	24.9
Harrisburg Medical Center	Harrisburg	0	5202	0	0	7.1
Heartland Regional Medical Center	Marion	9	8790	10.24	4.7	19.4
Herrin Hospital	Herrin	17	13692	12.42	7.2	19.9
Hillsboro Area Hospital	Hillsboro	1	1277	7.83	0.2	43.6
Holy Cross Hospital	Chicago	4	26115	1.53	0.4	3.9
Holy Family Medical Center	Monmouth	0	716	0	0	51.5
Hoopeston Regional Health Center	Hoopeston	0	611	0	0	60.4
Hopedale Medical Complex	Hopedale	1	1155	8.66	0.2	48.2
Illini Community Hospital	Pittsfield	0	1093	0	0	33.8
ILLINOIS VALLEY COMMUNITY HOSPITAL	Peru	2	4720	4.24	0.5	15.3
Jersey Community Hospital	Jerseyville	0	1814	0	0	20.3
JOHN H STROGER JR HOSPITAL	Chicago	19	48589	3.91	2.4	6.1
Kewanee Hospital	Kewanee	0	1294	0	0	28.5
Lake Forest Hospital	Lake Forest	2	13289	1.51	0.2	5.4
Lawrence County Memorial Hospital	Lawrenceville	3	1482	20.24	4.2	59.2
Loretto hospital	Chicago	2	15708	1.27	0.2	4.6
LOUIS A. WEISS MEMORIAL HOSPITAL	Chicago	14	26089	5.37	2.9	9
MacNeal Hospital	Berwyn	35	39320	8.92	6.2	12.4
Massac Memorial Hospital	Metropolis	1	2023	4.94	0.1	27.5
Memorial Hospital	Belleville	17	34701	4.9	2.9	7.8
Memorial Hospital	Carthage	1	1481	6.75	0.2	37.6
Memorial Hospital	Chester	1	1481	6.75	0.2	37.6
Memorial Hospital of Carbondale	Carbondale	14	17325	8.08	4.4	13.6

Mendota Community Hospital	Mendota	3	2047	14.66	3	42.8
Mercer County Hospital	Aledo	0	712	0	0	51.8
Metro South Medical Center	Blue Island	3	15893	1.89	0.4	5.5
Midwest Medical Center	Galena	0	964	0	0	38.3
Morrison Community Hospital	Morrison	0	1681	0	0	21.9
Mount Sinai Hospital	Chicago	7	31256	2.24	0.9	4.6
Northwestern Memorial Hospital	Chicago	78	110651	7.05	5.6	8.8
Norwegian American Hospital	Chicago	3	17238	1.74	0.4	5.1
Palos Community Hospital	Palos Heights	38	39572	9.6	6.8	13.2
Pana Community Hospital	Pana	0	496	0	0	74.4
Paris Community Hospital	Paris	0	1030	0	0	35.8
Passavant Memorial Area Hospital	Jacksonville	6	6914	8.68	3.2	18.9
Pekin Hospital	Pekin	9	7429	12.12	5.5	23
Proctor Hospital	Peoria	10	15081	6.63	3.2	12.2
Provident Hospital of Cook County	Chicago	0	3029	0	0	12.2
Red Bud Regional Hospital	Red Bud	0	3075	0	0	12
Richland Memorial Hospital	Olney	3	9563	3.14	0.6	9.2
Rochelle Community Hospital	Rochelle	0	864	0	0	42.7
Roseland Community Hospital	Chicago	2	11582	1.73	0.2	6.2
Rush University Medical Center	Chicago	71	81067	8.76	6.8	11
Saint Anthonys Health Center	Alton	6	6858	8.75	3.2	19
Saint Joseph Hospital	Chicago	23	31070	7.4	4.7	11.1
Sarah Bush Lincoln Health Center	Mattoon	1	12289	0.81	0	4.5
Shelby Memorial Hospital	Shelbyville	1	1520	6.58	0.2	36.7
Sherman Hospital	Elgin	7	27598	2.54	1	5.2
Silver Cross Hospital	Joliet	19	31228	6.08	3.7	9.5
Sparta Community Hospital District	Sparta	1	1875	5.33	0.1	29.7
St. Alexius Medical Center	Hoffman Estates	15	32275	4.65	2.6	7.7
St. Anthony's Memorial Hospital	Effingham	9	12415	7.25	3.3	13.8
St. Bernard Hospital	Chicago	11	19978	5.51	2.7	9.9

St. Elizabeth's Hospital	Belleville	8	23391	3.42	1.5	6.7
St. Francis Hospital	Litchfield	1	2856	3.5	0.1	19.5
St. Joseph's Hospital	Highland	0	2456	0	0	15
St. Joseph's Hospital, Breese	Breese	1	2067	4.84	0.1	27
St. Margaret's Hospital	Spring Valley	0	4518	0	0	8.2
St. Mary's Hospital	Streator	1	4167	2.4	0.1	13.4
Swedish Covenant Hospital	Chicago	25	40089	6.24	4	9.2
Taylorville Memorial Hospital	Taylorville	4	2813	14.22	3.9	36.4
Union County Hospital	Anna	1	1632	6.13	0.2	34.1
Wabash General Hospital	Mount Carmel	0	1495	0	0	24.7
Washington County Hospital	Nashville	0	1091	0	0	33.8
VHS Westlake Hospital	Melrose Park	5	18619	2.69	0.9	6.3

<sup>a</sup> Testing Method: Rates presented are categorized either as Molecular or Non-molecular depending on the test type utilized. Use of a molecular test, or nucleic acid amplification test (NAAT), such as PCR is the preferred testing method and detects more cases. Facilities that use the recommended NAAT/PCR test would therefore have more cases identified (appear to have higher rates) than if they used a less sensitive, non-molecular test such as Enzyme immunoassay (EIA).

<sup>b</sup> Pooled data: Pooled mean calculated for each “testing method” group by dividing the sum of CDI events for all reporting facilities within the “testing method” group by the sum of inpatient days for the “testing method” group.

<sup>c</sup> Rate per 10,000 patient days

<sup>d</sup> Community onset LabID Events are those for which the *C. difficile* positive stool sample was collected within the first three days of the hospital admission.

Community Onset (CO) rate: Number of CO Cases/Total Inpatient Days × 10,000

<sup>e</sup> Hospital Onset (HO) LabID events are those in which the *C. difficile* positive stool sample was collected on day four of the hospital stay or later.

Hospital Onset (HO) rate: Number of HO Cases/Total Inpatient Days × 10,000

<sup>f</sup> Hospital Associated (HA) LabID events are the sum of HO LabID events and CO-HA LabID events (positive stool sample collected within first three days of hospital stay and discharge from same facility in the previous four weeks).

Hospital Associated (HA) rate: Number of HA Cases/Total Inpatient Days × 10,000

<sup>g</sup> 95% Confidence Interval calculated based on exact Poisson distribution

